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THE PERCEPTION OF MOTION

THE recent papers of Messrs. Hollingworth[1] and Pitkin[2] upon what the former calls "The Law of the Resting Point" suggest that some analogous observations of my own may be of general interest. I will venture to leave my statement in the form in which it was written before Dr. Hollingworth's article appeared.

I

The key to our conception not only of the continuity, but also of the reality of nature is our perception of change. Hobbes's dictum, "Always to perceive the same thing is equivalent to perceiving nothing at all," is the assertion of what all experience seems to substantiate, *viz.*, that our perceptions gain their reality from their variety; and variety can be defined only in terms of change, or of passage from one thing to another. On the other hand, if the change or transition were absolute, if our perceptions were merely of isolated and unrelated things, we should again have no variety and no reality; Hobbes's dictum would apply to each thing in separation, and instead of a sum we would have only a set of meaningless ciphers: we might paraphrase Hobbes, "Never to perceive the same thing is equivalent to perceiving nothing at all." Perception of reality is contingent upon perception of sameness coupled with difference, unity with variety; and neither of these can be clearly conceived apart from the other.

The relation of sameness to difference, unity to variety, the one to the many, we represent to ourselves by means of the notions of change and motion. For example, we define any given line $m - n$ as the path of a moving point, passing from m to n; m and n represent the elements of difference in the total conception, the path, p, the uniting sameness; no element in the group is significant apart from the others. All our notions of motion, and hence all our notions

[1] "A New Experiment in the Psychology of Perception," this JOURNAL, Vol. X., page 505.

[2] "The Law of the Resting Point," this JOURNAL, Vol. X., page 657.

of space (which is a construct of lines), are built upon this idea. The case of non-spatial change is analogous. The succession of two experiences in time we conceive as a kind of addition, $\alpha + \beta$, in which the $+$ is a sort of tie at once joining and holding apart the qualities α, β, distinguished as *before* and *after*. Indeed, time in general is commonly symbolized by lines (time-curves, and the like) showing the fundamental identity of spatial and temporal continuities.[3] Purely ideal changes follow the same plan, as may be clearly seen in the syllogistic inference: *A is B, B is C, therefore, A is C; A* and *C* represent the differences united by the middle term *B*, which is the tie that justifies the passage from *A* to *C*, and which must be felt, even if it be not expressed, in the conclusion. A beginning, a middle, and an end, are alike present in our spatial, temporal, and logical perceptions; and in this general form of perception, the middle is the fluid or moving connection which tells us that *this* solid beginning has passed into just *this* solid end. "Everything that changes," saith Philosophus, "is something and is changed by something and into something"; and if we make that by which a thing is changed an inherent force (as ultimately we do), this saying will serve as a pattern for all our perception of reality.

The Greeks accepted as an axiom of physics that "some things are in motion and some at rest." This but states formally what our sense experiences continually assert. We see moving objects, but we see them as moving only because they traverse a stationary background, or because we ourselves are in motion, in body, in head, or in the eye muscles. From vision alone, unaccompanied by kinesthetic sensations, it is frequently impossible to tell whether it is the perceived objects or our own bodies which move. A familiar illustration of this is the experience of uncertainty which comes when one is seated in a railway car beside another train, as to whether it is one's own or the parallel train that is starting; the visual sensation of motion so strongly suggests the accompanying kinesthesis that it is only by comparing the observed train with some object known to be sta-

[3] Kurt Bernhard, in an article on "Die Relativität der Zeit" (*Archiv. für Systematische Philosophie*, XIII., 3), gives space a kind of conceptual priority to time for the interesting reason that "time is a straight line," *i. e.*, we fall back upon spatial representations when we wish to express temporal relations, but feel no corresponding necessity in regard to space, which (as geometry shows) is describable in terms of its own characteristics. The "*Zeitlinie*" is not a circle nor a closed curve, nor a type of curve leading into infinity; it has no single points, and it is continuous; the straight line, one dimension, is its proper image. This view is interesting in connection with Minkowski's suggestion ("Raum und Zeit," *Jahresbericht der Deutscher Mathematiker Vereinigung*, Vol. XVIII.) that time may be treated, mathematically, as a fourth dimension. . . . The problem involved seems to be one of the symbolization rather than of the intuition of these "forms of experience."

tionary that we can assure ourselves that we are not in motion. Similarly, if a train passes at express speed your own more slowly moving car, it gives you not only the visible, but also the bodily feeling of slowing down; you are able properly to judge your own speed by observation of telegraph poles or other stationary objects—which themselves have the illusion of motion. Thus it is evident that perception of motion is normally visual-kinesthetic; and in ordinary experience it is the kinesthetic element which tells us whether our bodies or the perceived objects are in motion; in other words, kinesthesis gives us perception of bodies in motion, vision of bodies at rest; or, in any given motion $m - n$, vision defines for us the limiting stations, m, n, kinesthesis supplies the connective p.

This must not be taken to mean that the sense of sight can not by itself give perception of motion. Most of our perceptions of motion are purely of this sense. Particles too small for detection while at rest become visible so soon as they are in motion; even so large an insect as the house fly is often difficult to discern if it remain stationary. Perhaps the most astonishing illustration of this power is the fact that the illuminated paths of ions—the infinitesimal particles of the infinitesimal atoms that compose the invisibly minute molecules—have been shown to be visible. And in the biological realm the fact that the very young of many animals escape observation by lying unmoving, while most animals may be startled into motionlessness, illustrates the relative imperceptibility of stationary objects. Furthermore, there is an obvious difference between visual perceptions of motion dependent upon a general kinesthesis and purely visual motion. In the former case, the movements observed are indistinct and blurred as compared with the minute discriminations of which pure vision is capable. Rapid motion of the body or the head or the eyeballs results in an impression of confused rather than of clear-cut change; it is only when the eyes are definitely focused upon an object that minute changes can be observed,—a glance at a sunny meadow shows it all green, while to our steady gaze it resolves into a play of colors. Perhaps we can generalize with the statement that bodily movement (kinesthesis) tends to resolve motions into *continuities*, static vision into discrete *elements*.

For it is not at all certain that our perceptions of motion, even in vision, are not ultimately kinesthetic. The structure of the eye is such that delicate accommodations are constantly taking place, and these are accentuated the moment the gaze is directed to follow a moving object. Further, the more rapid motions are not seen as motions, but as things. In the case of the ions, above mentioned, what is actually seen is an illuminated *path*, a streak or line, not at all a motion; it is like the wake of a meteor or a flash of lightning

which visually assumes an extended form because the motion is too swift for the eye to follow. This appears to be the case throughout nature; we see things as stationary when their motion is too rapid for the eye to follow; all vision is mediated by radiant energy, which represents the most rapid motion known to us, though it is never seen as motion, but only as color or light; so that we might say in general that a motion becomes visibly such in proportion to its slowness, or, at any rate, in proportion to its susceptibility to visual-kinesthetic analysis. A common illustration of the tendency of rapid motion to lose its character as motion is the case of the spokes of a rapidly revolving wheel, which with sufficient speed resolves into a disc of color, or into bands varying in hue with the distance from the hub. We might well liken the bands of the solar spectrum to a similar modification of the etheric vibrations whose different rates correspond to the several colors. Thus again we see actual movement perceived as visible magnitude—as thing or element rather than as transition.

It might be assumed that hearing and smell and the other senses exemplify a similar condition, that what appear to them as qualities are in fact but motions too rapid to be followed in their proper character, and hence are converted into states viewed as if constant. This would square admirably with the physical conception of the objective world as composed entirely of forces, or active energies. It is susceptible also of an obvious biological explanation. Motions which we are to perceive as motions would naturally be such as our bodies could accommodate themselves to; that is, our perception of motion as such is directly proportional to our powers of physical reaction. There is no biological reason why we should see as motion the infinitely swift movement of the lightning, for the reason that we could not dodge it could we see it coming; on the other hand, there is every reason why we should be able to follow the swiftest motions of other animals,—and in general it seems to be that our powers of analytic vision of motion are limited by the range of animal locomotion, the whirring wings of the humming bird and dragon-fly just passing our powers at one extreme, the vermicular slowness of the snail at the other; we can not quite see the mushroom grow, we can not quite see the lightning speed, but we do not *need* to see either. And in the case of sound, our analytic perception is again roughly bounded by the range of notes open to animal production, the almost inaudibly shrill pitch of some insects at one end of the gamut, the bass growling of the huger mammals at the other; outside of these there is mainly confusion and noise.

II

The actual relation of vision to the perception of motion is beautifully illustrated by certain artistic conventions. The swift motion of a quadruped running has been represented from ancient to

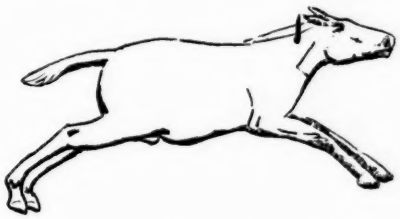

FIG. 1. Running wild ass; low relief, Nineveh.

modern times by picturing the limbs as extended, parallel before and behind, at their greatest reach (Figs. 1, 2). Instantaneous photography shows that at no time are all the four limbs raised in this manner; the position is a false one. As emphasizing the falsity and conventionality of civilized art in contrast to the superb naturalism of paleolithic European drawing, an interesting comparison has been made between these representations of running horses and the

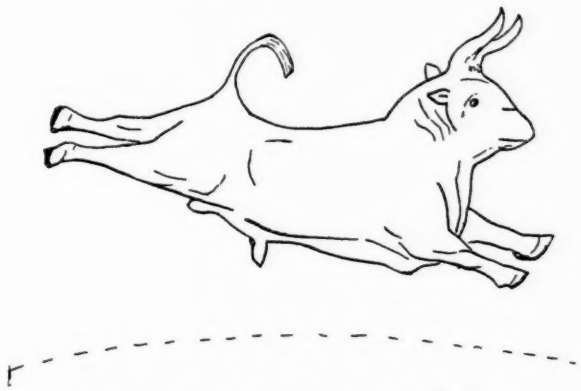

FIG. 2. Running bull; gold cup, Vaphio.

galloping or ambling deer drawn on an ancient bit of horn (Fig. 3); the attitude caught by the primitive artist is just one assumed by the galloping horse, as shown by instantaneous photographs (Fig. 4) and never reproduced in civilized art until so shown.[4] This is no doubt an interesting commentary upon the realistic truthfulness of paleolithic perceptions; but a moment's regard of the pictures will show that the artistic truthfulness of representation is all with the

[4] S. Reinach, "Apollo," Paris, 1904, pages 6–7.

civilized picturing,—the image of a horse running at top speed is properly suggested by the false drawing.

What is the reason for this? Clearly it is an idiosyncrasy of our vision of motion, and this may be stated: the movements of

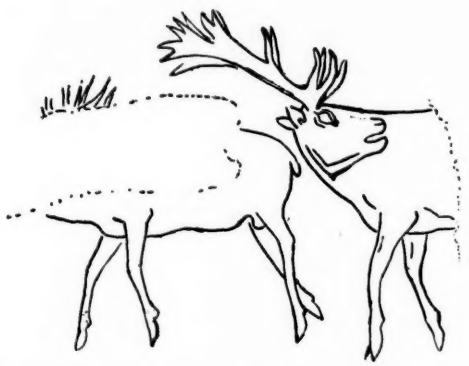

FIG. 3. Galloping reindeer; incised bone, Caverne de Lorthet.

rapidly moving objects are visually indicated by their points of comparative rest, which are also their points of maximum acceleration. This may be graphically indicated by the image of a pendulum (Fig. 5); at the extremity of its swing (*a*) it is in momentary pause, but just this position suggests rapid motion far more effectually than any intermediate position (*b*), while at the point of swiftest motion (*c*) it appears to be stationary.[5] The limbs of the running quad-

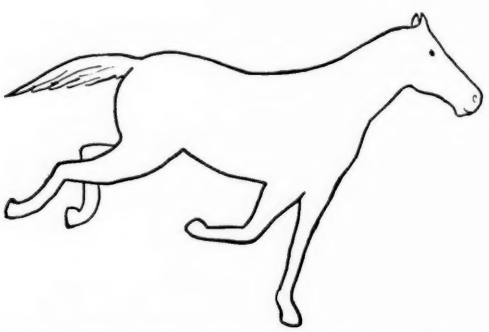

FIG. 4. Galloping horse, after an instantaneous photograph.

ruped are similarly seen at their highest swing, a point of momentary slackening and pause preparatory to regression. Of course this is actually the point of the greatest rate of change of motion, and it may indicate the maximum strain upon visual accommodation.

[5] I borrow this illustration from the suggestion of H. G. Spearing, "The Childhood of Art," New York, 1913, page 103.

Another illustration might be drawn from the revolving wheel; motion is actually seen, or best seen, in the twinkling of the spokes nearest the hub, where the movement is really slowest. Again, if you will watch a rapidly receding train or car, instead of a uniform shrinking of the image, it will be seen to diminish in a succession of contractions, the eye interpreting the constant motion as a series of

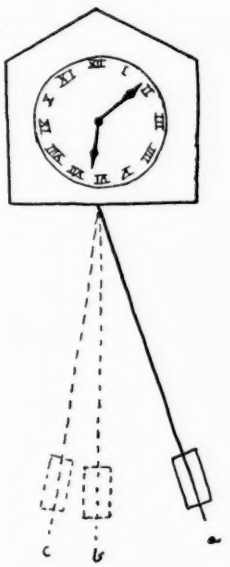

FIG. 5.

positions or pictures, very similar in effect to the flicker of a cinematographic picture. Thus, again, we find the function of pure vision to be the representation of rests rather than motions, the continuities which it perceives being in space rather than in time, and made up of stations or points rather than of transitions; the transitional element is mainly, if not exclusively, kinesthetic, so that we may reasonably doubt whether the fixed eye of a person congenitally anesthetic to muscle sensations would be able to perceive any motion at all.

An artistic convention of a different type gives us light from a different vantage. This is the tendency to *elongate* the bodies of moving animals. Doubtless the actual extension of the running horse or dog, head low and tail out, or of the flying duck, with neck straight, is greater than that of the same animal in repose; but there is no such elongation of the body itself as appears, for example, in the running bull of the Vaphio cup (Fig. 2) or in the ivory acrobats from Knossos.[6] The instinctive rationality of this

[6] *Cf.* Spearing, "Childhood of Art," Fig. 336*a*.

convention we must realize when we reflect, for instance, upon the relative ease with which we represent rapid motion in the case of the trout as compared with the bass, or the minnow against the sunfish; chubbiness is all at odds with speed, which pictorially tends to assume the general form of a streak.

The instancy with which we transpose motion in time into extension in space—visual movements into visual things—was beautifully illustrated by Professor Cattell's experiments with his wheel chronoscope.[7] "In the ordinary vision of daily life," he writes, "the eyes, the head and the whole body are in continual movement. There are no distinct and lasting images on the retina; the physical conditions are those of the photographic plate when the camera is constantly moved hither and thither. But the world that we see appears to each of us distinct and unshifting. When I glance across the room—along a row of books covering its side, for example—images follow one another in rapid succession, but I see this time continuum as a space continuum with all the objects duly arranged side by side." Professor Cattell's experiment hinges upon a moving stimulus rather than a moving eye (a distinction which is probably of moment, although the results are analogous, as see p. 283 above), but his records very clearly demonstrate the inevitability with which we spatialize our visual perceptions of change. I have observed the same fact in a slightly more complicated form: the after-image of a wheel (in the case noted, a brass electric fan) revolving so rapidly as to appear as a disc, when the eyes were suddenly cast to one side, spread out into an elongated band of color. Here, of course, we have both an obvious retinal and an obvious kinesthetic element, the two uniting to form an exaggerated spatial continuum. The elongation of the body of the Vaphio bull would seem to have a sound psychological *raison d'être*.

And here an adversion to Lessing seems in place—especially since the world of esthetics is just now torn between cubistical artists bent on proving him wrong with the brush and shocked critics manfully maintaining with the pen his invulnerable righteousness. "*Es bleibt dabei: die Zeitfolge ist das Gebiet des Dichters, sowie der Raum das Gebiet des Malers,*" is Lessing's famous dictum.[8] The crust of his discussion is the unpicturableness of motion, the preeminence of repose as the theme of plastic and graphic art. It is first to be noted that Lessing (yielding to an esthetic instinct which was surer than his critical theory) compromises his own generalization. His doctrine of the "fruitful moment," when he comes to apply it to the problem of motion (as distinguished from emotion),

[7] "On Relations of Time and Space in Vision," *Psych. Rev.*, VII., 4, page 325.

[8] "Laokoon," XVIII.

induces an immediate modification. "All bodies exist not only in space, but also in time. They endure, and can in each successive moment of their duration appear otherwise and stand in other relations. Each of these momentary appearances and combinations is the effect of a preceding and can be the cause of a following moment, and so can be regarded as the center of an action. Consequently, painting can imitate actions, though only indicatively through bodies."[9] In acceding to Herr Mengs's comment on the treatment of draperies by Raphael, Lessing is again concessive. He quotes Herr Mengs[10] as follows: "Every fold has with him (Raphael) its reason, be it on account of its own importance or from the movement of the limb. Often one may observe from the arrangement of the folds, how they have just been disposed; and Raphael finds significance in this. One sees, in the draperies, whether a leg or an arm, previous to its motion, has been advanced or retracted, whether the limb proceeds from bending to extension, or whether, having been outstretched, it contracts." It is undeniable that the artist, in this case, represents two distinct moments in a single image, says Lessing,—just as the poet, by multiplying his epithets, may outstay his artistic right in some unwontedly charming bit of space. The two arts must be mutually hospitable of such encroachments, like friendly neighbors; but "just as there, with the painter, the two distinguished moments border upon one another so immediately that, without hesitation, they may pass for a single one; so here, with the poet, the several indications of different parts and qualities in space follow one another with such compression and celerity that we believe ourselves to hear them all at once."

It is evident enough that Lessing was dealing with a bigger problem than the limited psychology of his time could qualify him to handle. In a certain broad way he is probably right as to the essential distinction between poetic and plastic "imitation." Nevertheless, when he comes to the minutiæ of his distinction he fails to give any satisfying account of the painter's significant moment, in so far as it is concerned with the technical portrayal of motion. May it not be that this moment is to be found just at that point in the progress where, perceptually, the movement is crystallized into the visual thing, the action converted into a visible embodiment? The primitive conventions which we have noted seem to imply this.

Of course it would be begging a number of esthetic questions if we were to permit such a satisfaction of Lessing's problems to legalize the "boundaries" which he sets for the arts. Modern painting makes use of spaces undreamt of in his day, and there is no compelling

[9] *Ib.*, XVI.
[10] *Ib.*, XVIII.

reason why the artist should not experiment with observational moments as well as with angles of regard; it is a mistake to suppose that we are going to stay by the mask of La Mettrie after we have discovered in it the gaping fool, and it may be that we will have caught and passed it in just that instant in which it is triumphantly the laughing philosopher; every one knows that pictures have their moments of glamor, and that it is just for these moments that we love them. Why may not the artist legitimately work for these rapt eternities rather than for the tedious interregna which we fill with conscious criticism? This need not be interpreted that I pretend to understand the cubists!

III

It would offend my temperament to leave this subject without suggesting some of its implications. I have touched upon these in the field of esthetics. For psychology they are quite as interesting. Instead of dealing with perception of time and perception of space as if they were as independent as ever Kant thought them, while perception of motion follows as a sort of evolution from their fusion, ought we not to start with perception of motion (or back of that with change) and proceed thence to the explanation of time and space? It is all very well, mechanically, to treat time and space as constants of thought; but mechanics is artifice, and psychically experience seems to follow an inverse mode. The geometers, who develop the idea of space from the idea of motion, seem to have the empirical right of way.

It would be a dereliction to fail to mention Bergson in this context—and supererogation to point the application. But may it not be true that *la durée réelle* esthetizes itself in Lessingian moments? Or again may it indeed be that infinite space and all the extended splendors of the universe are but the contemplated other of the timelessly egoical absolute? For metaphysics, too, our observations seem pertinent.

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SOCIETIES

NEW YORK BRANCH OF THE AMERICAN PSYCHOLOGICAL ASSOCIATION

THE New York Branch of the American Psychological Association met in conjunction with the Section of Anthropology and Psychology of the New York Academy of Sciences, on November 24 and on February 23. The November meeting was held at the psychological laboratories of Columbia University and the February meeting

at the psychological laboratory of Princeton University. The following papers were presented:

Professor Thorndike's Attack on the Ideo-motor Theory: PROFESSOR MONTAGUE. (To appear in full in a forthcoming number of this JOURNAL.)

The Color Vision of Animals: MRS. CHRISTINE LADD-FRANKLIN. (No abstract offered.)

The Character of Ideas: JOHN PICKETT TURNER.

Recent psychological literature shows a wide divergence of opinion as to what the proper task of psychology should be. On the one hand psychology is defined as the science of behavior. It is claimed that the student in his investigations can totally disregard what was once thought to be the true field of psychology, states of consciousness, ideas, etc. Such is the position of Watson. On the other hand, it is said to be the task of psychology "to study the structure of the mind as if there were no such thing as body," working in the main "as though there were nothing in the world except psychic facts." Both of these positions show the unconscious influence of the Cartesian tradition,—a disposition to set ideas apart in a class by themselves. There seems to be a general disposition among psychologists to take ideas out of nature. This is unfortunate; for ideas so regarded have lost their true character. Ideas are in and of nature. They are events in nature just as much as bodies, motions, and qualities are events in nature. Events in nature come into various relations. There are qualities known as color; so there are qualities known as meaning. Certain events imply certain other events. The psychologist should study ideas as events in nature. To do this he must rid himself of the unhappy habit of associating ideas exclusively with men's bodies. The important thing is that certain events are effectively related to certain other events, cortical or others. The one thing to remember is that ideas can be successfully studied only in the concrete. Such a position calls for the reinstatement of introspection in its former place of honor.

Measurements of Judgments of Certainty: RICHARD H. PAYNTER.

The purpose of this article is to state briefly the results of a series of experiments in which measurements of judgments of certainty or accuracy of recognitions were obtained. There have been many investigations concerning judgments of various psychological processes, but judgments of certainty have received much less attention. In the present paper different degrees of certainty are used, and the validity of judgments of certainty is measured in terms of the actual facts. By this method it has been found possible to say just how much value to assign to the judgment of one's own absolute certainty

or confidence. In order to compare the judgments of certainty of two or more individuals they must all have an equal number of recognitions. No attempt, however, is made to do this here. By asking the subjects to sort their recognitions of quarter-page advertisements just seen in piles of 100 per cent. certainty, 75 per cent. certainty, and 25 per cent. certainty, it is possible to measure not only the accuracy of recognitions for each of the piles, but also the judgments of the three degrees of certainty. This is done in the following manner. It is first necessary to get the per cent. of accuracy of recognitions of each pile. This is obtained by the use of Strong's formula

$$\frac{\text{correct recognitions} - \text{incorrect recognitions}}{\text{correct recognitions} + \text{incorrect recognitions}} \times 100.$$

The judgments for each of the three degrees of certainty are then obtained by calculating the per cent. the accuracy of recognitions of each pile is of the certainty or accuracy required by the pile. It was found that there are individual differences in judgments of certainty and they are largest in the lower degrees of certainty; that different degrees of certainty under the same conditions are not judged equally well; that the more valid judgments are found in the pile of absolute certainty; that the same degree of certainty is judged differently under different conditions; that the judgments are less valid in the more difficult situation; and that there is a general tendency to underestimate the high degrees of certainty and the underestimation increases with the difficulty of the task. Judgments of certainty in experiments on perception or recall memory may be measured in the same way as those in recognition memory. Finally it is of practical importance that no two statements of absolute certainty or any other degree of certainty be considered of equal value unless actually found so on measurement.

Transfer and Interference in the Substitution Test: HENRY A. RUGER.

The purpose of the study was to determine whether a well-formed rival habit or a poorly-formed one had the greater influence on the formation of a given habit. The plan of the experiment included an initial and final test series with a given key and a practise series with keys formed by varying the arrangement of the test key. For the practise series the group representing the well-formed habit practised on a single rival key; the group representing the poorly formed habit either constantly changed to a new key or practised fewer times on the same rival key. In addition to these two main groups there were three control groups and one group which practised on the test key. One of the control groups read newspapers during the practise period; another did addition, and the third worked on a different type of substitution. All the groups took the initial and final tests

with the test key. All the groups did better in the final than in the initial test. However, the rival-habit groups showed much less improvement than the control groups. Consequently there was a dominant interference effect. This interference effect was greater in the group that formed the one strong rival habit than in the one that formed one or many weak rival habits. The control groups were so planned as to have different degrees of relatedness in their practise series to the test keys. The newspaper group simply read what interested them—spontaneous attention; the addition group worked with voluntary attention and at top speed. The substitution-control group worked on material similar to the test series, but not conflicting with it. The three groups followed this, the above, order in the extent of the improvement of the final over the initial test. Since the difference, however, is less than the probable error, the control groups may be considered as equivalent in this particular case. The group which practised on the test keys showed two and a half times the improvement of the control groups, while the control groups showed twice the improvement of the poorly formed rival habit group and three times the improvement of the well-formed rival habit group. Improvement was measured in terms of substitutions per second.

Three hundred and fifty subjects took part in the experiment. Woodworth's and Well's color-naming and geometrical substitution tests were employed. The symbols forming the keys were five different letters or figures.

Some Tests for Efficiency in Telephone Operators: H. C. McComas.

Two methods may be followed in testing telephone operators; one, by analyzing the activities at the switchboard and examining each, the other by testing these activities as a whole. The latter was followed in the work at the Princeton Laboratory. The apparatus duplicated an actual switchboard, on a small scale. The operator made connections at the board and these were timed by a kymograph in an adjoining room. The kymograph records showed the time which elapsed between the appearance of a light over a call connection and the moment an operator "plugged in"; also, between the moment a number was called and its appropriate connection made. Fifty records in succession were taken for each subject. The operators were ranked according to the quickness of their reactions. This ranking was compared with the composite ranking made by two telephone supervisors independently. The test easily detected the two best, and two out of three of the poorest, of the nine operators supplied by the Princeton exchange.

This rather difficult test was supplemented by one which called for very much simpler apparatus; practically a test in motor coordination. The operator sat before a table supporting an upright board

upon which was fixed a sheet of paper containing ten crosses, arranged in three irregular rows. With a pencil she sought to touch the intersections of the crossed lines in quick succession. After each thrust at a cross the pencil point was brought down upon a blotter on the table. This gave a movement similar to that of the switchboard. Each subject was instructed to make the movements as quickly as possible, but not to sacrifice accuracy for time. Tests were made for each hand and with the sheets in various positions. The records in time were taken with a stop-watch; those for accuracy, by measuring the distances of the pencil marks from the intersections of the lines. The rankings thus obtained agreed remarkably well with the estimates of the supervisors, showing a correlation of .6250, with a probable error of .14 (by Spearman's Footrule). We have, then, in this form of the motor-coordination test a valuable means of detecting the quickness and accuracy of telephone operators,—two of the most important traits which make for success at the switchboard.

An Experimental Critique of the Binet-Simon Scale: CARL C. BRIGHAM.

The Binet-Simon scale was applied to 294 children from 6 to 16 years of age, the majority of cases (226) being under 12 years. Experimental conditions were adhered to as strictly as possible. The three investigators were always in ignorance of the physical age of the child being examined.

A normal distribution of cases about the "at age" position was found, 83 per cent. of the cases under 12 testing "at age," 3 per cent. "above age," and 14 per cent. "below age."

The scale was not uniform for all ages, as shown by the average age difference of each physical age group, given in the following array:

Physical age	7	8	9	10	11	12
Average difference	0	0	0	−0.5	−0.7	−1.4

The lack of tests above twelve years, and the difficulty of the "twelve year" tests cause the deviations from the norm at 10, 11, and 12 years.

The teachers and the principal graded the children into five groups according to mental capacity. The average age difference of the five groups correlated with the teachers' judgments were as follows: "Very bright" + 0.9, "Bright" 0, "Average" — 0.5, "Dull" — 0.9, "Very dull" — 1.8. In 4 per cent. of the cases there was a disagreement between the judgments of the school authorities and the results of the tests.

From the results of the investigation, it was found possible to conclude that the scale, as now standardized, measured the development

of intelligence of the children examined with at least 96 per cent. efficiency, and served as an adequate measure of comparatively slight individual differences in groups of the same physical age. The "twelve year" tests were found to be unsatisfactory. Sex differences were slight, girls possibly tending to vary more than boys. The influence of the personal equation of the experimenters upon the results of the tests was found to be negligible.

Recall in Relation to Retention:[1] GARRY C. MYERS.

Ten words were pronounced with regular tempo to 300 boys and girls of normal school, academy, seventh, and eighth grades. The subjects were made to believe it was a regular spelling test. At various intervals the several groups of each grade were surprised by the request to recall as many of the words as they could remember. All groups compared gave a final recall after the same interval (one hour, one-half hour, or three weeks). One group had two intervening recalls, one had one, and one had no intervening recalls.

The results for final recall are best with two intervening recalls, and for one intervening recall much better than for none. The gain by the five minute over the immediate recall is noticeably greater in its effect on the final recall, than the gain of immediate recall over no intervening recalls. The total percentages for the respective groups of girls are 89, 71, 58; for the boys, 73, 61, 52 (final recall after 30 minutes). The total percentages show a strong gain in efficiency in the final recall after one hour, as a result of immediate recall—girls, 76, 43; boys, 61, 40

On the whole the girls are noticeably superior to the boys and their mode is one degree higher for each period of time. For immediate recall and recall after one hour the mode for the boys is at 5, for the girls, at 6. After three weeks it is at 4 and 6, respectively. The average deviation from the mode is consistently greater for the girls than for the boys.

The pedagogical significance of these findings, especially in relation to drill and frequent reviews, is obvious.

A Comparison of Stylus and Key in the Tapping Test: H. L. HOLLINGWORTH.

During a prolonged series of tests both stylus and telegraph key were used in the tapping test by the same persons. The paper presented some comparison of the results secured by the two methods. Data secured by the two methods can not be treated as even qualitatively comparable,—the two methods not only do not yield the same results, but they do not seem even to test the same function. The key is much slower than the stylus, the difference increasing with practise.

[1] This paper is published in full in the *Journal of Educational Psychology*, March, 1914.

The best individual by one method is not the best by the other. There is 20 per cent. gain as the result of practise, when using the stylus, but no gain at all in the use of the key. The variability of the records is greater with the key than with the stylus. With respect to amount of improvement through practise, individuals stand in the same relative order by the two methods, but the individual variabilities are quite different in the two cases.

The Work Curve for Brief Period of Intense Application: R. S. WOODWORTH.

Though the question of mental fatigue has been most examined in prolonged work, it is possible that a characteristic work curve should be obtained from short periods. In collaboration with Drs. Wells and Pedrick, the author has studied periods of 5–40 seconds in controlled association tests (logical relations, color naming, simple directions), series of 10 or 20 stimuli being visually presented all at once, and the subject being required to react to the stimuli one after another without intermission. The time of each single reaction was recorded in order to see whether the speed of reaction changed in the course of the series. The work curve so obtained varies from trial to trial, but on the average, runs a definite course. The initial reaction is the slowest, the next few the quickest of all, then comes a gradual decline of speed till the last reaction, which is quicker than those just before it. In the traditional language of the work curve, we find here a rapid warming-up, followed by progressive fatigue and an end-spurt. These conceptions are, however, of questionable value when applied to so brief a period of work, and a truer interpretation may be had from the notions of overlap and interference. The "fatigue effect" is here, probably, an index of the steady accumulation of interferences, while the warming-up and end-spurt effects can be connected with the overlapping of the reactions to successive stimuli. Overlap acts to the advantage of the performance as a whole, in spite of the division of attention involved; but in the case of the first reaction, the division of attention is present without any chance of gain from the overlap, while in the final reaction the division of attention lapses and the advantage of overlap remains. When the same test material is used with an interval of a few seconds between the presentation of successive stimuli, both overlap and interference would be expected to drop out; and, in fact, the work curve under these conditions reduces practically to a dead level.

A Comparison of the Influence of Strychnine and Caffeine on Mental and Motor Efficiency: DR. A. T. POFFENBERGER, JR.

The paper is based on a comparison of the results of two recent studies, namely, "The Influence of Caffeine on Mental and Motor Effi-

ciency," by H. L. Hollingworth,[2] and "The Effects of Strychnine on Mental and Motor Efficiency," by A. T. Poffenberger, Jr.[3] Striking differences appear in the action of the two drugs upon certain mental and motor processes. The two tests were conducted on the same general plan, and comparison of the two is both permissible and easy. The tests were those well known in every psychological laboratory. Motor ability was tested by the tapping test, coordination test, and the steadiness test, while the mental ability was tested by the color naming test, opposites test, cancellation test, and calculation tests.

Caffeine caused an increased efficiency in most of the tests, the amount of increase varying with the size of the dose. Exceptions to this statement were few, the principal one being the decrease in steadiness with the increase in the size of the dose of caffeine. No after effects were noted during the course of the test which extended over a period of about forty days.

The strychnine test, covering about the same period of time, showed none of these effects, except in the case of the steadiness test where there was a suggestion of decreased steadiness after a dose. There was neither an increase in efficiency nor a retardation measurable during the period of the test.

The explanation of the difference is to be looked for in the seat of the action of the two drugs in the nervous system, the latter acting primarily on the cord and medulla and the former affecting the higher centers of the cerebrum.

H. L. HOLLINGWORTH,
Secretary.

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IDEALIST TO REALIST, ONCE MORE: A REPLY

IN a recent number of this JOURNAL[1] Mr. J. E. Turner makes a justifiable criticism not, I think, upon my argument against "neo-realism," but upon a questionable expression in my statement of the argument. He objects to my attributing to the realist the "certainty that he is . . . having a complex experience described by the terms yellowness, coolness, etc."[2] As Mr. Turner truly says the realist would hold that he is describing "the object, not his experience as yellow." Mr. Turner's criticism is simply met, and

[2] "Archives of Psychology, No. 22, 1912.

[3] *Am. Jour. Psychol.*, 25, 1914, 82 ff.

[1] "Miss Calkins on Idealism and Realism," this JOURNAL, Vol. XI., pages 46 ff.

[2] This JOURNAL, Vol. VIII., page 453, quoted, Vol. IX., page 603. The sentence is not quoted entire by Mr. Turner.

my meaning is correctly expressed, by replacing the word "described" by the word "indicated."[3] For however firmly the realist asseverates that he is describing an extra-mental entity he can not, and does not, deny that by the term "yellow" he also indicates that part of his experience (or consciousness) which he calls "seeing yellow."[4]

The idealist's argument may then be restated, omitting the term which Mr. Turner criticizes. Such a restatement runs, briefly, as follows: Both the idealist and the neo-realist admit (1) that they have a consciousness indicated by the terms "yellow," "cold," and the like. The neo-realist holds (2) that he also perceives directly an extra-mental object, yellow and cold. But if this second statement be challenged (as by one who says "the object is gray, not yellow") the neo-realist must fall back upon the position which he occupies with the idealist. No reiterated assertions, "the object is yellow," "yellow . . . is an adjective applicable only to material objects"[5] will prevail against the stubborn counter-assertion, "No. The object is gray." There is nothing left to the realist except the insistent statement "I have the consciousness indicated by the term 'yellow,' not by the term 'gray.'"

This proof, from the admitted occurrence of illusion,[6] that the object of immediate certainty is experience (*i. e.*, consciousness) is merely the first step in an idealistic philosophy. But it is an undemolished barrier to all forms of neo-realism.

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REVIEWS AND ABSTRACTS OF LITERATURE

Proceedings of the Aristotelian Society. 1912–1913. N. S., Vol. XIII. London: Williams and Norgate. 1913.

It has been noted by several observers that the influence of Bergson in England has been much stronger than in America. This opinion is confirmed by a comparison of the "Proceedings of the Aristotelian Society" for last year with the topics discussed before the American Philosophical

[3] I have used this expression in the paragraph next to that from which Mr. Turner quotes. *Cf.* this JOURNAL, Vol. VIII., page 453, paragraph 3.

[4] This JOURNAL, Vol. XI., page 48, paragraph 2. There is much to be said for Mr. Turner's contention that the term "experience" can not be unambiguously used. In the idealist's mouth it means "consciousness," whereas the realist often interprets it to mean "object as experienced."

[5] Turner, *op. cit.*, pages 48–49.

[6] *Cf.* A. O. Lovejoy, *Philosophical Review*, 1913, XXII., pages 410 ff., for criticism of the various attempts of neo-realists, in "The New Realism," to explain illusion.

Association during the same period. Of the thirteen papers in the British volume, three deal directly with the French vitalist and three more indirectly criticize some of his dominant hypotheses. Besides these six there are two which reveal an interest in the problems of vitalism. Interest in Bergson, however, is far from being identical with Bergsonism. And after reading this volume, nobody will accuse the Aristotelian Society of having degenerated into a revival meeting of neo-vitalists.

Mr. Bertrand Russell's leading article, "On the Notion of Cause," at once disappoints and pleases the reviewer. Mr. Russell seeks to show that the law of causality, as usually stated by philosophers, is false and is not employed in science. What he actually succeeds in proving—and most clearly, too—is that the definitions of causality (and necessity) given in Baldwin's "Dictionary" are false and never used by scientists. The reviewer would gently protest that Mr. Russell unduly flatters this literary *informe ingens cui lumen ademptum* when he assumes that it represents the opinions of philosophers on the nature of cause. Rather than attack this blind Cyclops, Mr. Russell might better have selected the statements of half a dozen contemporary thinkers. That would have been fairer to philosophers, at any rate.

Mr. Russell next considers the nature of scientific laws; and he finds that, far from stating that one event A is always followed by another event B, they state "functional relations between certain events at certain times, which we call determinants and other events at earlier or later times or at the same time." No *a priori* category is involved in this; scientific laws are purely empirical and not universal except in a trivial and useless sense. The most interesting point in Mr. Russell's paper is his argument (which unfortunately falls short of being a proof) that "a system with one set of determinants may very likely have other sets of quite a different kind; that, for example, a mechanically determined system may also be teleologically or volitionally determined." This, of course, has come to be pretty familiar among those who have worked in the mathematical-logical problems of philosophy; and it is susceptible of a variety of proofs, some of which have been set forth by various writers, but without particular reference to the philosophy of causation. Would it not have been useful, in Mr. Russell's essay, to have repeated the proof with this reference?

To the reviewer, it appears that Mr. Russell ought to have expanded considerably the most difficult and novel proposition in his analysis, namely, that the scientific law of cause makes no difference between past and future. "The future determines the past in exactly the same sense in which the past determines the future." The word "determine" here has a purely logical significance; a certain number of variables "determine" another variable if that variable is a function of them. With this the reviewer entirely agrees, as far as it goes; but it does not bring under scrutiny those very peculiarities of the so-called "necessary connection" which differentiate it from other instances of simple logical determination. There is a specific difference between the relation of lightning to thunder

and the relation of the two sides and included angle of a triangle to the third side. For instance, the thunder-lightning relation seems to be a *real* irreversible in spite of the fact that, in its logical determination, the later event determines the former and *vice versa*. Briefly, then, the causal determination is a species of the genus function-variable. The scientist deals with causes and effects generically, and finds this very useful; even as the politician may deal with men generically as vertebrate bipeds with appetites and reactions. But the metaphysician *ought* to study his objects, be they causes or people or what not, in their full specificity. But the mathematician who reconsiders thunder and lightning merely as instances of function and variable is being pragmatic in the bad sense of this foggy adjective.

The second essay of the volume, by Mr. G. Dawes Hicks, considers "The Nature of Willing." In a most happy manner, the author shows the all but incorrigible vagueness of philosophers in their use of the term "will." He then restates Lotze's acute description of man's complete ignorance of all that happens between an act of conscious volition and the fulfilment of the resolve. Mr. Hicks, accepting this account, concludes that "what specifically characterizes volition as a fact of mind must be, to a large extent, independent of the execution which is its normal consequent." Because of this, argues the writer, "it is exceedingly improbable that in the primitive stages of conation there could have been in any way prefigured or foreshadowed in a specific conative act the results which would ensue from that act." "Anything, therefore, of the nature of an idea of end or purpose must, in that case, be absent from the early phases of the life of consciousness." Primitive life lacks volition; and even in mature life, the willing agent, "from being comparable to an operator, to whom the various details of his apparatus are familiar . . . might more appropriately be likened to a subordinate laborer who, to the working of the machine, the inner structure of which he has neither seen nor comprehends, contributes merely the external appliances necessary to set it going." Mr. Hicks ends by casting doubts upon the propriety of invoking "dispositions" to explain how the act of will or the idea of the end desired passes over to fulfilment. "Disposition" merely blankets our ignorance of the process with an easy name. The conclusion of the article is that mental activity can not be identified with conation.

In "Purpose and Evolution," Mr. Arthur Lynch, a reformed Spencerian, intones a pleasant song of revolt against Spencer and Darwin. There is a purpose in the world; but the singer does not argue his case. He asserts it fierily, with frequent choruses from eminent natural scientists (in the footnotes). Mr. Lynch is profoundly impressed with the fact that man is gaining a mastery over Nature and is working his way toward "independence of authority" and free imagination.

"A New Logic" is presented by E. E. Constance Jones. It is a criticism of Charles Mercier's recent book of the same title. Mr. Mercier wishes to discard the traditional analysis of a proposition into subject

and predicate and to substitute therefor the relation of "Ratio": thus, "*A* is unequal to *B*" would be analyzed into the terms *A*, *B*, and the specific relation of inequality. Miss Jones points out that, as the number of distinct "ratios" (types of relation) is indefinitely great, no classification of propositions would be possible. The critic heaps objection upon objection, until Mr. Mercier is—or ought to be—confounded.

The fifth paper is by Mr. Frank Granger, on "Intuitional Thinking." This is a peculiarly worded, but significant analysis of perception and "higher" intuitions. Mr. Granger shows, among other things, that normal perception is stereoscopic in time; that is, we do not perceive instantaneous characters, but rather genuine duration characters in which past, present, and future are "fused"—or, to quote the author, "gathered into one aspect." The reviewer must protest against the language here, but not against the fact which Mr. Granger notes. The words suggest that a "mind" somehow seizes things in different times and places and condenses (interpenetrates) them into one time (and perhaps one place). Now this is not what Mr. Granger means; he means, I take it, that the act of intuition is itself extended in time and nevertheless truly single. The stereoscope does condense; it brings two space fields into one field. But apparently this is not strictly analogous to the intuiting of time and things in time. The intuiting itself is approximately coterminous temporally with the things intuited.

The most ingenious point in the essay is Mr. Granger's explanation of the felt difference between an intuited object and a conceived one. The real order is a time order, says he, and irreversible; but the conceptual order is timeless and hence can be thought of, so to speak, forward or backward or in any artificial arrangement we choose to cast its elements into. The feeling of this plasticity is the mark of a concept. Formal logic is a mechanicism for economizing the elements of the intuitional series, and so rendering them more adequate to present reality in its narrative form. Reality is irreversible; and real propositions are (consequently?) inconvertible.

"What Bergson Means by Interpenetration" is told by Miss Karin Costelloe. Bergson's "duration" is a process of indivisible and spontaneous change; and it is in this process that interpenetration occurs. In describing duration, Miss Costelloe makes one very obscure and startling statement. "The thing of really fundamental importance in *durée* is interpenetration. Spontaneity really follows from this." This alleged dependence is not made evident, and certainly it calls for more light. To establish it would be a metaphysical triumph of no mean order. Interpenetration occurs when and where "the parts depend for their qualitative character upon their connection with the whole of the rest of the process." A discrete process, on the contrary, is one whose parts are independent and externally related. Duration thus shows itself to be very different from time, which is a dimension whose elements are uniquely ordered and reciprocally external.

In "The Analysis of Volition," Mr. R. F. A. Hoernlé concludes that

volition is a word of as many meanings as there are psychologists; and that "the disagreement between psychological theories is not, at bottom, of the kind which can be settled by an appeal to 'fact,' in the sense of introspective evidence. On the contrary, it is due to differences of principle." Psychologists differ as to the nature and aim of analysis, about the methods, and about the concepts to be used. The issue is: what kind and what degree of abstraction should psychology practise? This is met indirectly by a discussion of the following questions: Is volition simple or complex, derivative or unique? Does realization or action belong to the essence of volition? What are the limits of a single volition within the stream of consciousness? And what is the relation of volition to will? The aim of the discussion being to bring out the conflicting presuppositions behind them, Mr. Hoernlé's remarks touch many problems in many ways and so can not be adequately summarized here.

Next follows a brief abstract of L. P. Jacks's essay: "Does Consciousness Evolve?" It shows that the evolution "of consciousness" is quite distinct from the "evolution" of consciousness. The former is the development within the conscious series; the latter is the genesis of the series itself out of something else. This distinction becomes important in all discussions of purposive activity. Action prior to consciousness seems purposive when considered by consciousness; how, the query then arises, does the purpose operate? There is the temptation to say, as Caird does, that the end is dimly present to the mind. Jacks goes on to show how this view involves the psychologist's fallacy.

William W. Carlile, in his paper entitled "Kant's Transcendental Esthetic with Some of Its Ulterior Bearings," extends the application of the Kantian doctrine considerably beyond its original range. He shows that many propositions not ordinarily considered analytic (in Kant's sense) really are. The necessary analytic proposition rests on the law of contradiction. Any proposition, then, the denial of which would contradict, explicitly or implicitly, either the proposition itself or any other one which is presupposed by it, must be analytic. Thus, "a man who is stone-blind can not distinguish red from yellow" is analytic; for the term, stone-blind, means inability to see colors. The very process of naming, therefore, fixes the character of the analytic proposition; and "it consequently affords no basis whatever for the view that the origin of truths of this sort is, in any sense, independent of experience." Now, the striking thing about Mr. Carlile's essay is that it extends this view so as to include Kant's synthetic truths. In working out this hypothesis, the author undertakes to show that all metageometry is vitiated by its initial assumptions, all of which involve contradictions. Incidentally, he sees no difficulty in proving Euclid's postulates of parallelism, the indemonstrability of which first suggested the logical independence of the Euclidean postulates and led to the attempts to deduce systems from other than the Euclidean set of propositions.

Miss L. S. Stebbing writes on "The Notion of Truth in Bergson's Theory of Knowledge." Miss Stebbing renders a genuine service in re-

porting Bergson's highly significant, but all too little known "Introduction à la Metaphysique" published in 1903 in the *Revue de Metaphysique et de Morale*. More clearly than any other words from his pen, this sharp essay reveals how completely the neo-vitalist is enmeshed in the ancient substance-attribute notion of things. There are two ways of knowing a thing, he there tells us: one by considering the thing from the outside, and one by entering the inside of it. The former is relative and analytic; the latter gives us the real thing. The inside of a thing contains its real nature. Intuition, in that essay, is not opposed to intellect as in Bergson's later writing; it is rather a sort of "intellectual sympathy," to quote Bergson.

But this is not the main consideration in Miss Stebbing's paper. She is chiefly interested in showing that Mr. F. C. S. Schiller is entirely wrong in claiming that Bergson and his two disciples, Le Roy and Wilbois, champion a pragmatic theory of truth. The reviewer agrees heartily with Miss Stebbing's contention that both Bergson and Le Roy take a view of truth which is entirely different from the James-Schiller theory. But she will probably be assured by the Bergsonians that they are in hearty agreement with both James and Schiller, not to mention every other person who loves that blessed word Anti-intellectualism. This, too, in spite of the palpable fact that Bergson and Le Roy assert that thinking serves only practical needs and, in so doing, deforms the truth to suit those needs; whereas Schiller considers truth itself as a mere value. For Le Roy there is a point of view beyond reason; for Schiller, all mental life is purposive and hence never can attain insight to a world "in itself." For Le Roy, truth is not a value; it is movement, action, growth. In it there is nothing permanent; it is progress and not certain results. Still more clearly than Le Roy, Wilbois feels the need of going beyond the limited pragmatic interpretation of conceptual knowledge and finding truth elsewhere. Miss Stebbing goes on to draw a somewhat audacious parallel between Aristotle's doctrine of *nous poietikos* and the Bergsonian active intuition; and yet, audacious though it is, the comparison doubtless is profound, especially if one charitably minimizes the importance of the rational in Aristotle's hypothesis. The significant thing about Bergson's "intuition" is its supposed power of leaping the barriers of normal pragmatic thinking and coming to grasp the real world in an entirely impractical fashion. For Bergson this, the highest achievement of consciousness, is essentially useless; that is, it serves no particular purpose. How different from Schiller and James!

Finally, Miss Stebbing exhibits the utter confusion of the Bergsonians in failing to separate the problem of the nature of truth from the problem about the criterion of truth.

Next follows a lengthy symposium on the question: "Can there be anything obscure or implicit in a mental state?" This is discussed by Messrs. Henry Barker, G. F. Stout, and R. F. A. Hoernlé. Mr. Barker argues that "the notion of implicit, like that of unconscious, mental elements is . . . at variance with the very nature of consciousness itself." Mr.

Stout maintains the opposite. There are, he says, contents which are not separately discerned. Mr. Hoernlé agrees with neither, but with Mr. Mitchell's view of the implicit.

As one might guess from its title, "Memory and Consciousness," Mr. Arthur Robinson criticizes Bergson's "Matter and Memory." He considers four points: the adequacy of Bergson's account of memory, the part consciousness plays in his theory, the nature of the unconscious, and the power of intuition to transcend intelligence. His answers to these four problems run as follows: Bergson's treatment of memory neglects the fact that memory is an assertion . . . and falls into serious difficulties through an analysis which rests on the presupposition that everything which can be called structure falls on the side of matter. Secondly, if recollection is to aid choice, it must be possible for consciousness to illumine the situation; but Bergson holds that freedom diminishes with every increase of intelligence, and that intuition is unavailable because it is divorced from action. Here the reviewer is constrained to say that Mr. Robinson has seriously misconstrued Bergson; *practical* freedom does not diminish with increased intelligence, according to him. Only theoretical truth in metaphysical matters dwindles. Thirdly, Bergson falls into a contradiction when he makes the past completely present in every later stage of reality and yet insists upon the reality of change. Finally, psychology and philosophy can never "join hands," if Bergson is right in making science use intelligence, and philosophy employ only intuition.

The volume closes with a study of "The Philosophy of Probability" by A. Wolf. This is an endeavor to show that both complete determinism and complete indeterminism must fail to afford logical justification for the estimating of probabilities, and hence we must postulate partial determinism. This, says Mr. Wolf, is the normal assumption of common sense. There is real, "objective" chance, particularly in living creatures, but not in physical stuffs.

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The Authorship of the Platonic Epistles. R. HACKFORTH. Manchester: University Press. 1913. Pp. 203.

After a general introduction of thirty-five pages, which contains a review of the history of the question as to the genuineness of the Platonic Epistles, a summary of the supposed results of the stylometric investigation of the Platonic canon together with a revision of Raeder's list of rare words found in the Epistles, there follows a separate discussion of the claims of the thirteen letters in numerical order. As a useful summary of the previous work of numerous scholars, so far as it was known to the author, the discussion possesses a certain value; but too much of the best work was quite unknown to him, and the author contributed too little original matter or argument to affect the judgment of a scrupulous critic. The conclusion to which the inquiry leads the author may be given in his own words (p. 188): "The result to which we have been led by the fore-

going discussion is that we may hold five of the Platonic Epistles genuine, viz., iii, iv, vii, viii, xiii, that we must reject five, viz., i, ii, v, vi, xii, and that the remaining three, ix, x, and xi, must be left doubtful."

The very statement of this result ought, it would seem, to give the critic pause; for it raises more questions than it purports to solve. Above all, one is tempted to ask how so heterogeneous a collection—for even a superficial glance at the series of Epistles will show that it is a collection deliberately made for a purpose—could have come into existence if more than half of its constituent members was spurious and the remainder genuine. Our author's explanations fail to carry conviction; for they do not touch upon the vital points. Unfortunately for the success of Mr. Hackforth's study, but most fortunately for those who are seriously interested in the question of which he treats, another scholar about the same time opened up an entirely new vista by addressing himself to the more fundamental problem of the existence and purpose of the collection itself. I refer, of course, to the essay of Professor Otto Immisch, then of Giessen, now of Königsberg, "Der erste platonische Brief" (*mit einer Einleitung über den Zweck und einer Vermutung über die Entstehung der platonischen Briefsammlung*), in *Philogus,* LXXII. (N. F. XXVI., pp. 1–41). It is not too much to say that the whole question must be reopened and the results of renewed studies awaited before we can pronounce upon the genuineness of the collection; although I am as thoroughly convinced of its spuriousness now as I was eighteen years ago when I published my "Pseudoplatonica."

W. A. Heidel.

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J. G. Fichtes Werke in sechs Bänden, mit drei Bildnissen Fichtes, herausgegeben und eingeleitet von Professor Dr. Fritz Medicus. ca. 4500 pp. in 4°. Leipzig: Fritz Eckardt und Felix Meiner.

"Neoromanticism" is one of the most favored catchwords of modern thought in Germany. Springing from the very midst of this new movement a young German publisher, Fritz Eckardt, undertook some years ago to prepare a new edition of the classics of German philosophy in the early nineteenth century: Fichte, Schelling, Schleiermacher, Hegel—the romanticists in philosophy. These new Eckardt-editions, combined with the well-known editions of the "Philosophische Bibliothek" (formerly Dürr) have been taken over by another publishing house, that of Dr. Felix Meiner.

The Fichte-edition has just been finished in memory of the—apparently little noticed—one hundred and fiftieth anniversary of Fichte's birth (May 19, 1912). The only heretofore existing Fichte-edition, published by J. H. Fichte, has become rare. Moreover, it was full of inaccuracies and misprints, and the demand for a new edition became so great as almost to be an urgent necessity. The new edition, with its careful text, tries to meet this demand. It is, however, not quite complete. A few of the less important writings by Fichte, especially those of a biographical nature, have been omitted. All his other writings appear unabridged and

in chronological order. The paging of the earlier Fichte-edition has been followed in the new, so that references relating to the former may readily be looked up in the latter. Finally, a very detailed index, which amounts almost to a Fichte dictionary, and an instructive introduction, both by Fritz Medicus, one of our best Fichte scholars, form an addition which is not the least important feature of the work.

GÜNTHER JACOBY.

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JOURNALS AND NEW BOOKS

THE PHILOSOPHICAL REVIEW. January, 1914. *The Problem of Knowledge from the Standpoint of Validity* (pp. 1–16): ARCHIBALD A. BOWMAN. – The fact of knowledge is the *reality* with which epistemology starts. The standard of validity, thus becoming an internal one, takes the form of the distinction between the scientific and the non-scientific. Rationalism affirms the identification of the scientific with the valid; pragmatism denies this. This antithesis, it is asserted, contains a common presupposition, and from this presupposition the validity of knowledge is determined, with illustrations from the critical philosophy of Kant. *Truth, Reality, and Relation* (pp. 17–26): JOSEPH A. LEIGHTON. – Examines in some detail the arguments of Professor Perry in support of the neo-realistic theory of relations; criticizes his ontological pluralism; concludes that "there can be no absolutely independent facts out of all relation to other facts or themselves devoid of relational structure." *Hocking's Philosophy of Religion: an Epirical Development of Absolutism* (pp. 27–47): DOUGLAS CLYDE MACINTOSH. – The idealism of Professor Hocking is a synthesis of the historical forms of mystical, logical, and psychological idealism. Accepting (though this acceptance is criticized) the claims of naturalism, realism, and subjective idealism, he proceeds by dialectic to the position of absolute idealism, the dialectic supported at all points by an appeal to intuition. A critical examination of this intuitional appeal reveals, it is maintained, too exclusive emphasis upon mysticism, an unwarranted use of the ontological argument, and too little regard for the empirical and practical. *Discussion: Unreal Subsistence and Consciousness* (pp. 48–64): W. P. MONTAGUE. – A reply to Professor Lovejoy's criticism of the New Realism. Defends the writer's own view of the problem of error, agrees with his critic as to the "menace of relativism," and restates and defends his own theory of consciousness. *Reviews of Books:* Heinrich Richert, *Die Grenzen der naturwissenschaftlichen Begriffsbildung: Eine logische Einleitung in die historischen Wissenschaften:* GEORGE H. SABINE. Josiah Royce, *The Problem of Christianity:* A. C. ARMSTRONG. Emile Myerson, *Identité et Realité:* JOSEPH A. LEIGHTON. *Philosophische Abhandlungen, Hermann Cohen zum 70sten Geburtstag* (4 *Juli* 1912) *dargebracht:* WALTER T. MARVIN. G. J. Blewett, *The Christian View of the World:* HENRY W. WRIGHT. *Notices of New Books. Summaries of Articles. Notes.*

REVUE PHILOSOPHIQUE. December, 1913. *Mémoire Affective et Cénesthésie* (pp. 561–595): P. SOLLIER. – The existence of such memory is a fact, although the fact is generally obscured by the greater utility of other types of memory; the former types are more difficult to evoke, but are as persistent as sensorial memory; kinesthetic memory is "only a manifestation of 'cenesthesie,'" the latter being the basis of the linking of our recollections to our personalities. *La Logique du Rêve et le Rôle de l'Association et de la Vie Affective* (pp. 596–613): J. PERES. – "The thought of dream puts itself directly in opposition to the world of waking by the predominance, not alone of our internal sensations, but also of the entire automatic material of representation. . . ." These conditions, coupled with the play during sleep, of the laws and habits of normal thought, lead to the characteristic incoherencies and contradictions of dreams. *Les Fondements Objectifs de la Notion d'Electron* (pp. 613–642): A. REY. – This second installment utilizes the phenomena of the ionization of gases (Thomson and Rutherford) as further evidence for the objective reality of the elementary quantity of electricity. *Revue Critique. L'Histoire des Théologies et des Philosophies Médiévales:* MAURICE MILLIOUD. *Analyses et Comptes Rendus.* Augustin Guyau, *La Philosophie et la Sociologie d'Alfred Fouillée:* E. BOIRAC. A. Cresson, *L'Espèce et son Serviteur:* DR. JANKÉLÉVITCH. *Revue des Périodiques. Notices Bibliographiques.*

Proceedings of the American Society for Psychical Research. Vol. VII., No. 3. Pp. 391. $2.00.

Hartmann, Henry G. A New Conception of Relativity and Locke. Cincinnati: University Press. 1914. Pp. 96. $1.00.

Keller, Ludwig. Die Freimaurerei. Leipzig: Verlag von B. G. Teubner. 1914. Pp. 147. 1.25 M.

Müller-Freienfels, Richard. Poetik. Leipzig: Verlag von B. G. Teubner. 1914. Pp. vi + 98. 1.25 M.

Münsterberg, Hugo. Grundzüge der Psychotechnik. Leipzig: Verlag von J. A. Barth. 1914. Pp. ix + 767. 16 M.

Rand, Benjamin. Shaftesbury's Second Characters or the Language of Forms. Cambridge: University Press. 1914. Pp. xxix + 182. $2.50.

NOTES AND NEWS

THE meeting of the *Kant-Gesellschaft* held this year in Halle, April 18–20, was in the nature of a "*Jubiläumsveranstaltung*" to celebrate the tenth anniversary of its organization. In honor of the visitors a special performance of Mozart's "Magic Flute" was given in the Opera House. The founder of the society, Dr. Hans Vaihinger had written a "Prolog" for this opera, in which he disclosed the intimate relation existing between its theme and Kant's works. Dr. Bauch, of Jena, and Dr. Felix Krueger, of Halle, gave the principal addresses of the meeting. The former in his paper "Ueber den Begriff des Naturgesetzes," agreed with Helmholtz's

statement that a law of nature is a universal concept, and held that this must be understood, not in a nominalistic or realistic sense, but in the mathematical sense of a "function." Dr. Krueger, "Ueber den Begriff des Wertes" emphasized the necessity of distinguishing sharply the questions of value, of being, and of knowing. Since Kant's time we hold in mind that no "*Ding, oder Zweck an sich*" has value, but that every value has to justify itself before the reason. Out of mere being it is impossible to deduce an ought. Our judgments of value are, for the most part, experienced as "*Wertgefühl*" and it is not the content but the "*Wertgefühl*" that gives value. That which gives value, *viz.*, "the feeling of value," must possess *absolute* value. Since the founding of the society on April 22, 1904 (the hundredth anniversary of Kant's birthday), the membership has increased from 32 to 800 and the endowment from 15,000 M. to 42,000 M. The interest from the fund is used in giving prizes for the most acceptable treatment of given subjects, in supporting scientific journals, and in reprinting rare philosophical works of the eighteenth and nineteenth centuries. Besides a large number of German philosophers, several from Russia, Switzerland, and Austria were in attendance.

DR. JOSIAH ROYCE, since 1885 professor of the history of philosophy at Harvard University, has been transferred to the Alford professorship of natural religion, moral philosophy, and civil polity, left vacant by the retirement of Professor Palmer.

MRS. CHRISTINE LADD-FRANKLIN has recently given lectures at Cornell University on Color, and at Chicago on Color and Logic. She will also lecture at the University of Illinois on these subjects.

DR. EDWARD K. STRONG, JR., of the department of psychology at Columbia University, has been appointed professor of psychology and the psychology of education at George Peabody College for Teachers.

PROFESSOR W. V. BINGHAM is on leave of absence from Dartmouth College for travel and for study at Cambridge University. He will return in time to continue his directorship of the Dartmouth summer session.

DR. MARY T. WHITLEY, instructor in educational psychology, Teachers College, Columbia University, has been promoted to an assistant professorship in that institution.

THE editors of the *Psychological Review Publications* have announced the election of Dr. Shepherd I. Franz to the editorship of the *Psychological Bulletin.*

DR. DAVID CAMP ROGERS, associate professor of psychology at the University of Kansas, has been appointed professor of psychology at Smith College.

PROFESSOR HENRI BERGSON gave the first of his Gifford Lectures in Edinburgh, on Tuesday, April 21. The subject was "The Human Personality."

THERE will be a joint session of the Mind Society, the Aristotelian Society, and the British Psychological Society at Durham, July 3 to 6.